

SATCOM Requirements Assessment Project (SRAP)



Presented to:

**Capt Bump /
N6M**

10 July 2001



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Outline



- **SRAP Goals**
- **Scope**
- **SRAP Model**
- **History**
- **Results / Recommendations**
- **Customers**
- **Summary**



SRAP Goals



- **Develop a tool to assess the ability of the proposed DoD SATCOM architecture and programmed Navy IT capability to satisfy Navy throughput requirements for DPG scenarios.**
 - Assist OPNAV N6/N8 in POM decisions
 - Assist OPNAV in BW BAM assessments
 - Assist SPAWAR in POM & implementation decisions
- **Define and model the future DoD SATCOM and Navy IT architectures producing models that can be reused in Navy and DoD-wide M&S efforts.**
 - OPNET Models
 - Include all segments of SATCOM architecture
 - **Wideband**
 - DoD Owned (DSCS/DSCS SLEP, WGS, AWS)
 - Commercial Augment (INTELSAT (CA), Others)
 - **Narrowband**
 - DoD Owned (UFO, MUOS/ANS)
 - DAMA Controller (JMINI)
 - Commercial Augment (INMARSAT, Others)



SRAP Goals



- **Include all segments of SATCOM architecture (Cont.)**
 - **Protected**
 - **UFO-E/EE**
 - **MILSTAR (LDR, MDR)**
 - **AEHF (LDR, MDR, XDR)**
 - **APS**
- **Include all applicable SATCOM terminals**
 - **Afloat Platforms**
 - **CVBG (CVN, CG, DDG, SSN, AOE)**
 - **ARG (LHA/LHD, LSD, LPD)**
 - **CMD (LCC/AGH, MCS, JCC-X)**
 - **MSC (T-XXX, T-AH, T-AGOS)**
 - **Ashore Nodes**
 - **NCTAMS**
 - **DoD Teleport**



Scope Of Effort

Fleet Needs "End to End"

Bandwidth Baseline Assessment Memorandum

NAVSPACECOM Limits

Charter / Expertise / Resources

Afloat Users

Shore Users



IT Infrastructure

IT Infrastructure

Base band

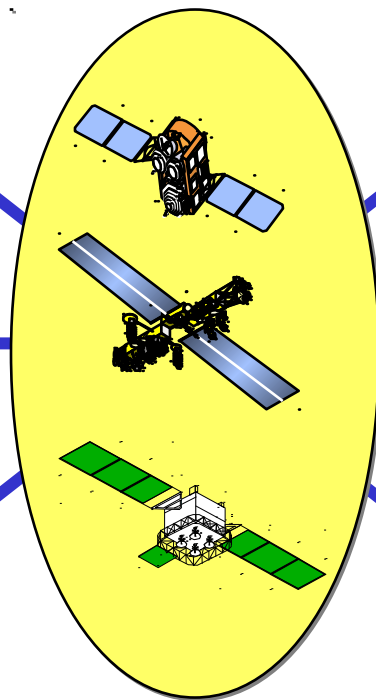
Base band

Base band

Base band

Base band

Base band



"User to Baseband"

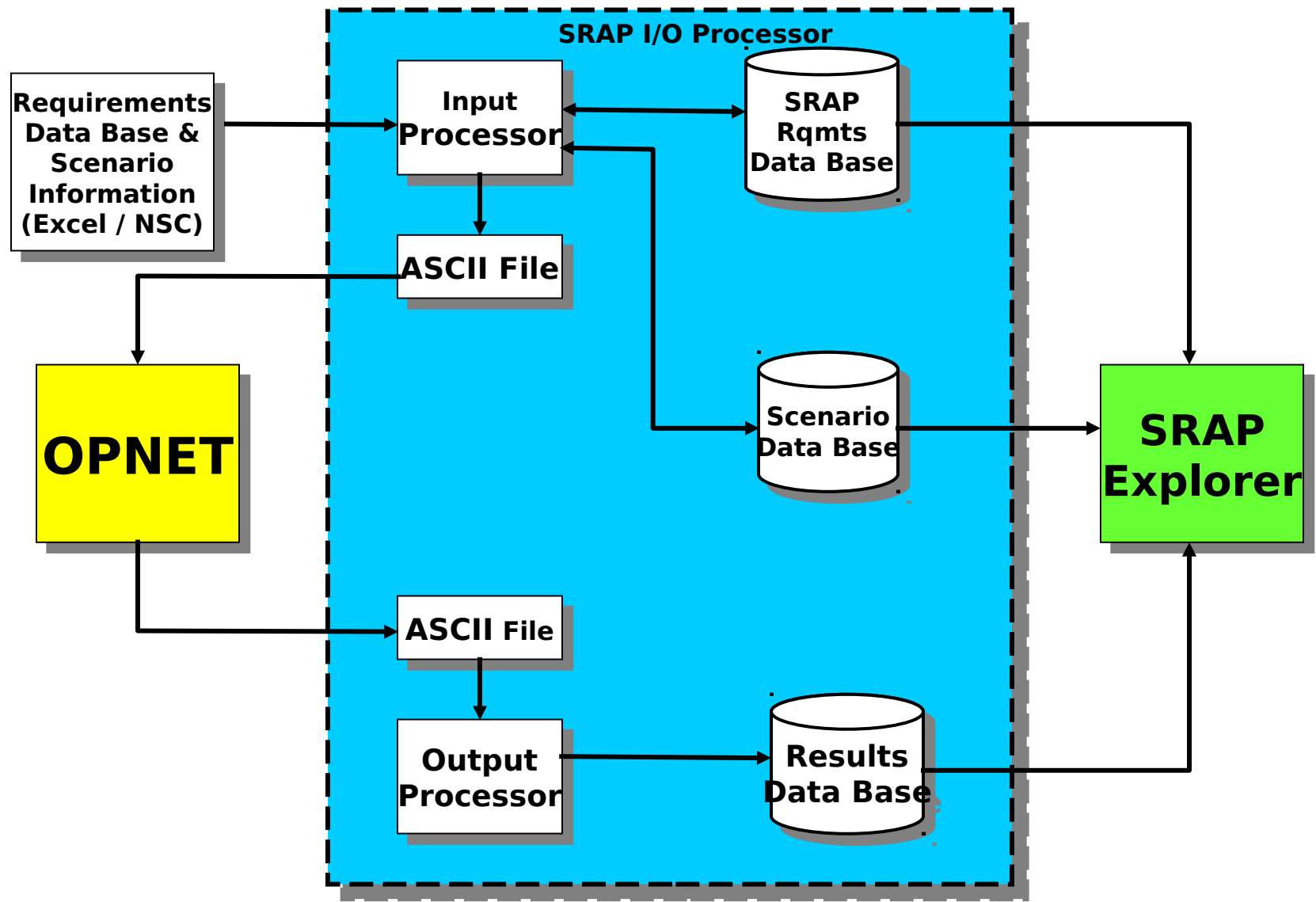
"Baseband to Baseband"

"Baseband to User"

Data Flows Both Directions



SRAP Model





SRAP History



Study Date	FY-98	FY-99	FY-00	FY-01	FY-02	FY-03
Scenario Date	N / A	2005	2006	2006	2006	As Req
Goal	Background Data	WB-NB-PR Architectures	Wideband Model Development	Narrowband Model Development	Protected Updates & Model Maint As Req Development	
M&S Software	TBD	COMNET / MAST	OPNET	OPNET	→	
M&S Expertise	Aerospace Corp	Aerospace Corp	Aerospace Corp	Aerospace Corp	→	
Oversight / Technical	NAVSPACE / N52	NAVSPACE / N52	NAVSPACE / N52	NAVSPACE / N52	→	
Data Base Prep / Maint	SEMCOR	SEMCOR / ACSS	Titan / ACSS	Titan / ACSS	→	
Funding Source	NAVSPACE (\$25K)	NAVSPACE (\$150K)	NAVSPACE (\$300K)	CNO / N6M (\$500K)	> \$500K (Est)	~ \$200K (Est)

Note: Items in RED are currently unfund



FY 99 SRAP

Summary / Recommendations



- **Protected**

- **Appears to be sufficient LDR resources to support Navy requirements**
 - > Loadings assumed least robust modulation modes
- **Insufficient MDR resources to support Navy requirements**
 - > Downlink hops
 - > Disadvantaged terminals
- ***Navy should endorse efforts to maximize MDR capacity ! !***

- **Wideband**

- **Requirements exceed available capacity**
- **Terminal throughput limitations severely impact requirements satisfaction**
 - > Navy should fund major terminal upgrades
- **Only one of five satellites from DSCS / WGS constellation within view of scenario location. DoD may want to rethink placement of these satellites to provide overlap in this AOR**
- ***Full requirements satisfaction will require augmenting DoD owned WB systems with commercial WB ! !***
 - > ***Navy should program funds in POM 02 to ensure 2005 requirements satisfaction ! !***

- **Narrowband**

- **With perfect management of available spectrum, there is sufficient resource to satisfy >90% of Navy's requirement**
- ***Navy should continue efforts to field all DAMA capable terminals***
- **More accurate picture will require changes to model and assumptions**



FY-00 (Wideband) Summary / Recommendations



- **Navy WB Terminal Investments**
 - **Ensure that WSC-6 (V9) is Ka band capable**
 - **Simultaneous X and Ka links**
 - **All surface platforms**
 - **Improve WB Modems**
 - **Current WSC-6 data rate restrictions - 2048 Kbps**
 - **New terminals should be designed to take advantage of WGS capabilities with an eye toward Advanced Wideband System**
 - **Processed waveforms that support BW on demand**
 - **Make known phase array antenna intentions**
 - **Improve Sub HDR to include Ka band**
- **Ensure baseband equipment (switches, routers, etc.) are ready to support WGS / AWS throughput capability**
 - **Both afloat and ashore**
- **Navy should advocate for “Bandwidth-on-Demand” capability for Advanced Wideband System (AWS)**
- **Fund follow-on M&S efforts to model entire SATCOM architecture**
 - **Narrowband - FY-01**
 - **Protected - FY-02**



FY-01 (Narrowband) Goals



- **What will Narrowband Analysis Provide**
 - **Identify Navy's NB requirements for MTW**
 - **Adjusted for dynamics of scenario**
 - **Impact of operating UFO channels with DAMA**
 - **JMINI Controller Modeled**
 - **DAMA Protocols**
 - **Dynamic allocation of channels and time slots**
 - » **Use and release resource**
 - **DMR Terminal Modeled**
 - **Active channels**
 - **Guard channels**
 - **Understanding of number of simultaneous users that can be satisfied**
 - **Per Channel**
 - **Per Satellite**
 - **Per AOR**
 - **Starting point for MUOS M&S studies**
 - **UFO modeled**
 - **DAMA controller modeled**
 - **Legacy UHF terminals modeled**



FY02 SRAP Goals - General



- **Model protected architecture**
 - **UFO E / EE**
 - **MILSTAR (LDR / MDR)**
 - **AEHF**
- **Use same scenario as previous efforts**
- **New modeling challenges - protected architecture is more complex**
 - **Protected models will be classified**
- **Leverage off previous developments such as MCPT-i**



SRAP Customers



- OPNAV
 - BW BAM (N6 / N8)
 - SATCOM Resources
- SPAWAR
 - PD-17 (PMW-176)
 - PD-14 (PMW-146)
- Fleet N6's
 - CPF N6
 - MILSTAR Capacity (9 Mbps vs 40 Mbps)
 - CLF N6
- NAVSEA
 - PMS 210 (Mine Warfare)



Summary



- **Model status:**
 - **Wideband model completed (FY00)**
 - **Narrowband model now being finalized (FY01)**
 - **Protected (FY02) will complete the entire DoD SATCOM architecture.**
- **SRAP Customers throughout Navy C4I community**
- **All models will be made available to the Joint community.**

Bottom Line:

- **Navy in the lead for modeling overall SATCOM architecture**
- **Potential cost savings to DoD resulting in more “bang for the M&S buck.”**
- **Joint M&S capability fielded much sooner.**



Questions ?